Improving the Resilience of Mixed-Farm Systems to Pending Climate Change in Far Western Nepal

Baseline Survey Report

Helen Keller International Nepal
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Acknowledgements

We gratefully acknowledge collaboration with Utah State University (USU) that allowed us to undertake this baseline survey in Bajura District, Far Western Nepal. This effort was conducted under the auspices of a program entitled *Feed the Future Innovation Laboratory—Adapting Livestock Systems to Climate Change.* The baseline survey was designed with the technical guidance of D. Layne Coppock (USU) and was ably modified and implemented by Mahesh Shrestha and Nirmala Pandey from Helen Keller International (HKI). Support provided by the HKI field team, led by Diwakar Duwal, is also gratefully acknowledged, as is the contribution of the HKI research analysis and review team. The research and review team included Sanjeev Giri (SPSS data coding), Dr. Megha Raj Banjara (data analysis and reporting), and Sanoj Tulachan (review and editing). The cooperation of the residents from the Jugara, Budhiganga, Gudukhati, and Atichaur study communities are particularly thanked for their generous participation and important contributions to the survey results. This work was made possible through support provided by the Bureau for Economic Growth, Agriculture, and Trade, U.S. Agency for International Development, under the terms of Grant No. EEM-A-00-10-00001. The opinions expressed herein are those of the investigators and do not necessarily reflect the views of the U.S. Agency for International Development or the U. S. government.

Dale Davis
Country Director
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Executive summary

This report provides a summary of the main results of a household baseline survey carried out in late 2013 in four village development committees (VDC) in Bajura District. A total of 320 households were surveyed with 80 per VDC. Two of the VDCs have been subsequently targeted for interventions related to climate change adaptation, while two VDCs have voluntary agreed to serving as paired "controls." This baseline survey was undertaken as part of a study entitled, '*Improving the Resilience of Mixed Farm Systems to Pending Climate Change in Far Western Nepal'*, conducted by USU and HKI. The baseline survey was carried out using a household survey instrument. Male and female household heads were interviewed via a semi-structured questionnaire. Questions covered general information concerning household and land resources, annual income and expenditures, participation in community groups, community governance, water resources, livestock production, crop production, food- and health-related problems, needed development support, and information on out-migration of family members.

The data analysis provided in this report focuses on the absolute estimation of resource endowments and the relative occurrence of various socio-cultural, economic, agricultural, and natural-resource features across the four VDCs. A summary of findings is provided on pages 30-31, and those details will not be reproduced here. Overall, the four VDCs appear similar in most respects and this justifies the research design of our continuing work. The households exhibit the typical social, economic, and resource characteristics of Bajura District. Income levels are low and the people are typically poor and food insecure. Holdings of land and livestock are meager, and the need for off-farm income is prominent. Labor migration is therefore common for all VDCs. There is a general awareness among survey respondents of a changing climate overall, and it is recognized that the agricultural systems need to adapt. Perhaps the most important finding from the baseline effort is the continuing, and wholly traditional, character of crop and livestock production. There was little, if any, evidence of farmer innovation or farmers planning to cope with future problems. There were no reports of people seeking outside information or new technology. We suspect that this reflects the profound social, economic, and physical isolation of these communities from the outside world, and illustrates the fundamental challenge of how to help such communities adapt to climate change when they are so incredibly marginalized. Survey results suggest that these communities most desire human health-care interventions, climate-suitable seeds, local production of more nutritious food, and improved access to water. These priorities were somewhat similar to those revealed in Participatory Rural Appraisal (PRA) diagnostics conducted during the previous year. Data are being rigorously analyzed at USU to assess statistically significant variation among the VDCs. The initial results provided here remain as an invaluable initial snapshot that can guide further thinking on the project.

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Abbreviations

VDC	Village Development Committee
DLSO	District Livestock Office
HKI	Helen Keller International
MoAC	Ministry of Agriculture and Co-operatives
GDP	Gross Domestic Product
HHs	Households
USU	Utah State University

1.0 Introduction and Objective

1.1 Background

Nepal is an agricultural country, with more than 78 percent of the population dependent on agriculture for their livelihood. Livestock are an integral part of the Nepalese farming system, contributing 12 percent to the GDP (MoAC, 2011).

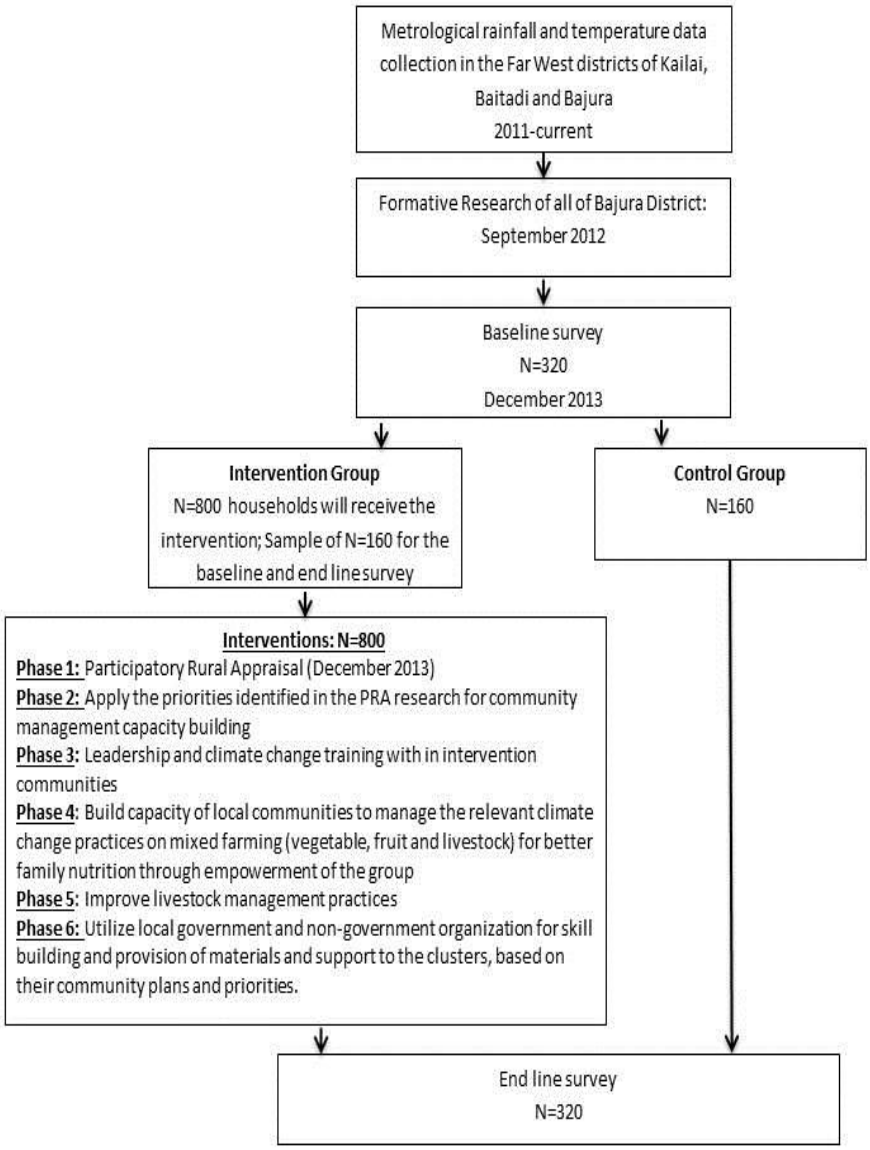
In the winter of 2008-9 Nepal endured one of the worst droughts in the country's history, and as a result crop yields were severely decreased across the nation, with wheat and barley production reduced by 14 and 17 percent, respectively. Crop yields in some districts in mid- and far-western Nepal received less than 50 percent of average rainfall from November 2008 to February 2009 (WFP, 2009). The drought conditions worsened the already serious nutrition circumstances in the country. Of the 75 districts in Nepal, 40 experienced food deficits; half of the children under the age of five in these districts are stunted, 39 percent are underweight and 13 percent are severely malnourished (WFP, 2009).

The food security situation in the hills and mountains of Bajura District is critical. About 7.5 percent of the population is landless and only 4.4 percent of the population has year-round food sufficiency; over 60 percent of households are food sufficient for only 6 months of the year (DLSO, 2010-1). People in Bajura District are vulnerable to extreme weather, as they have to depend on the environment for their livelihood and have less capacity to cope with and adapt to the adverse effects of unpredictable changes due to lack of economic and technological capabilities. Building farmers' capacity to adapt to environmental variation through new technologies, management practices, knowledge, and education is one of the mechanisms for coping with climate change. Specifically, such tactics can include technical training in animal feed production, animal-shelter management, improved soil-management practices for cultivated fields, post-harvest conservation techniques, income-generation practices, and improved savings and credit techniques.

As part of an overarching study on *Improving the Resilience of Mixed Farm Systems to Pending Climate Change in Far Western Nepal* by USU and HKI, an initial assessment was conducted in May and June of 2013 using a Participatory Rural Appraisal (PRA) protocol to diagnose priority problems in four selected VDCs in Bajura District. The key identified problems across four VDCs were: (1) Lack of drinking water; (2) declining crop yields; (3) the need to commercialize livestock production; and (4) the need for more off-farm employment (Anon, 2013).

Results from the PRA exercise also confirmed that the community members were unaware that environmental changes they were observing—such as warmer, drier weather and more crop pests—were part of a global climate-change pattern. Based on the results of the PRA study, community action plans were created to target priority problems with specific interventions. As part of a comprehensive research approach, baseline and endline surveys were needed to assess the outcome of the interventions. Therefore, a baseline study was conducted in the same four VDCs. Two of the VDCs were designated as the future recipients of adaptation intervention while two were designated as paired control VDCs. The objective of the research design was to initially document baseline attributes for both intervention and control VDCs. A future endline survey will allow assessment of intervention impact when attributes of intervention and control VDCs are compared. Figure 1 outlines the study design and timeline.

Figure 1: Background Study Design and Timeline



1.2 Objective

- Determine baseline attributes of households that comprise selected VDCs in Bajura District. Ideally, the baseline attributes of the two intervention VDCs should be similar to those of the two control VDCs.

2.0 Study Design and Methodology

2.1 Study design

The baseline survey was conducted in December of 2013. The survey topics are summarized below. The survey was conducted in the following VDCs: Jugada, Budhiganga, Atiechaur, and Gudukhati. The first two were designated as future sites for interventions, while the latter two were designated as paired controls with no interventions. The research design was approved by the Institutional Review Board (IRB) at USU and in Nepal. Informed consent was obtained from all participants via standardized Letters of Information translated in Nepali.

2.2 Study district and sites

Bajura District is one of the most remote, poorest, and food-insecure districts in far western Nepal. Bajura District is highly vulnerable to a changing climate, and hunger and drought are frequent phenomena.

The four VDCs (Figure 2) that served as study sites were selected based on expert opinion regarding key community attributes during the initial phase of investigation (Figure 1). The VDCs (Jugada, Budhiganga, Atiechaur and Gudukhi) were selected based on their similarity in socio-economic conditions and farming practices (M. Shrestha, pers. comm.). The research design required that VDCs be paired. Paired VDCs were thus most similar to each other. The Jugada intervention site was paired with Atiechaur, while the Budhiganga intervention site was paired with Gudukhati.

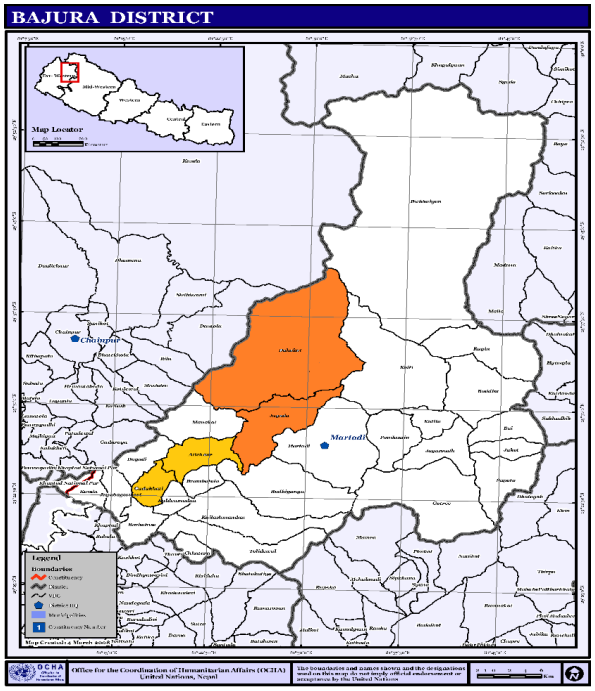


Figure 2: Bajura District with intervention (orange) and control (yellow) VDCs identified.

2.3 Sample size, selection of households and respondents

The survey was conducted in 80 households (henceforth abbreviated as HH) per VDC, or 320 HH in total. This yielded 160 HH for the two intervention VDCs and 160 HH for the two control VDCs. This represented a very high sampling efficiency overall that varied from 38 to 44 percent of all HH in the survey. The total number of HH per VDC varied from 181 (Atiechaur) to 218 (Gudukhati; see Table 1).

Each VDC also has HH that appeared to vary in terms of wealth (Table 1). The PRA exercises revealed that HH categorized as "poor" comprised from 74 to 82 percent of each community, while the remaining HH were categorized as being of "medium wealth" or "less poor" (D. Duwal, pers. comm.) Being "poor" was generally defined as the group that has enough home-grown food to fulfill HH needs for three to six months per year. Being of "medium wealth" was generally defined as the group having enough home-grown food to fulfill HH needs for the entire year. Ultimately, however, it was decided that such wealth differences were actually minor and

created sampling challenges for a stratified sampling design. Simple random sampling was thus preferable to use (D. L. Coppock, pers. comm.)

Table 1: Household (HH) Distribution in Four VDCs as Categorized by Wealth.

Wealth Group	Number of HH			
	Jugada (PRA site)	*Atiechaur (Paired control with Jugada)*	*Budhiganga (PRA site)*	*Gudukhati (Paired control with Budhiganga)*
Poor	145	147	173	162
Medium	37	34	39	56
Total	**182**	**181**	**212**	**218**

The random samples of HH in each VDC were selected using a systematic procedure. A sampling frame of HH names was prepared for each VDC and HH were selected from the list using an interval determined by the quotient of the local HH number divided by 80. The sampling interval therefore ranged from two to three. This results in a truly random sample as long as there is no underlying pattern in the HH list.

Heads of selected sample HH were approached and requested to give their informed consent to participate in the survey. In case of a refusal, the HH was replaced by another HH that was randomly selected. The rate of refusal to participate was less than one percent overall. Ideally, it was hoped that a HH would be represented by both a male and female head in the survey, as the combined input would lead to more accurate information. A breakdown of household-head respondents by gender is shown in Table 2. In accordance with our IRB approval, no youths (age 18 or younger) were allowed to participate in the survey.

Table 2: Surveyed HH heads by Gender

Survey Respondents by Gender	Number of Households
Female HH head only	193
Male HH head only	125
Both(male & female) HH heads	47
Total	**365**

2.4 Data collection instrument

A 50-question, semi-structured survey was administered for each of the 320 HH. The questions dealt with general attributes including HH composition, land resources, annual income and expenditures, participation in local community groups, community governance, water resources, livestock production, crop production, food-related problems, health-related problems, and development support needed. A copy of the survey is provided in Annex A.

2.5 Enumerator training

Eight local enumerators were recruited by HKI. An extensive enumerator training was conducted for five days in Martadi, the district capital for Bajura. The training focused on the objective of the baseline study, the survey methodology, detailed review of the survey

instrument, and issues related to ensuring high-quality data collection. A general calendar for training and survey implementation is provided in Annex B.

2.6 Data collection

As shown in Annex B, data were collected from 9 to 19 December in 2013. For each VDC, teams of two enumerators were formed for survey implementation. The eight enumerators were supervised by two HKI staff. Data-quality control was also performed by HKI staff at the headquarters in Kathmandu.

2.7 Data management and analysis

After the data were collected they were coded, entered, and edited to ensure accuracy. Coders had previously checked each question thoroughly for consistency, reliability, and validity. A database was prepared in CSPro, which is intended to control for inconsistent or invalid data during the data entry process. A batch edit program was developed in CSPro for data cleaning. The clean data were then transferred into SPSS version 13.0 for a preliminary descriptive analysis. The data summaries for this report are based on means and percentages comparing HH that represent the two intervention VDCs versus those representing the two control VDCs. Henceforth, these are referred to as one combined "intervention group" and one combined "control group."

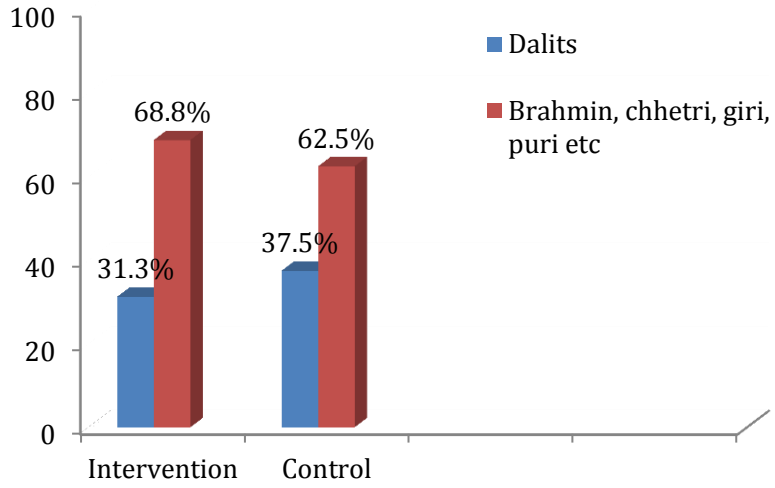
3.0 Preliminary Findings

3.1 Household features

3.1.1 Age, ethnicity, household size, occupations

The mean age of male HH heads was 42 years of age in the intervention group and 40 years of age in the control group. Female HH heads tended to be younger, with a mean age of 35 years old in the intervention group and 34 years old in the control group. Household ethnicity data showed that 31 and 38 percent of respondents in the intervention or control groups, respectively, are of Dalit ethnicity (Figure 3). In the intervention group 67 percent of respondents were involved with the initial PRA assessment conducted by HKI earlier in 2013.

Figure 3: Ethnicity of Sampled Household Heads



The average HH size in the intervention group was seven people compared to eight people per HH in the control group. Table 3 illustrates that among HH members over the age of 10 years, agriculture is the most common occupation in both groups. The second leading occupation reported was "student," this may be because the majority of household members are under the age of 15 (47 percent) in the control group and between the ages of 16 and 45 years (43.3 percent) in the intervention group.

Table 3: Occupations for Household (HH) Members ≥10 years of age.

Current Occupation	Intervention Group (no. of persons per HH)	Control Group (no. of persons per HH)
Agriculture	324	274
Business	8	6
Government service	36	20
Student	221	241
Foreign employment	6	1
Daily wages (seasonal labor migration to India; on and off farm)	93	166
Others (sewing, social mobilizer, contractor)	4	15

3.1.2 Education

Table 4 shows that the majority of household members in both the intervention (36.4 percent) and control group (35.6 percent) have received some primary education. Approximately 23 percent of household members in both the intervention and control group have been exposed to a lower secondary education or higher. Twenty-six percent of household members in the control group reported to be illiterate compared to 21.9 percent in the intervention group.

Table 4: Household (HH) Education Level

Education Level	Intervention Group (% of HH members)	Control Group (% of HH members)
Illiterate	22%	26%
Literate (non-formal education)	12%	10%
Primary (grades 1-5)	36%	36%
Lower secondary (grades 6-8)	14%	10%
Secondary (grades 9-10)	7%	6%
Higher secondary (grades 11-12)	5%	3%
Bachelor degree or above	2%	1%
No response/missing	2%	8%

3.1.3 Land Resources

Almost 60 percent of intervention HH and 86 percent of control HH reported owning some traditionally irrigated land (Table 5). Refer to section 3.6.3 for details on irrigation methods. Approximately one third of HH in both groups (34.4 percent in the intervention group and 33.1 percent in the control group) reported renting traditionally irrigated land for farming. Among 24 HH in the intervention group and 32 HH in the control group, the main reason for having rented land was not having irrigated land of their own.

Table 5: Household (HH) Land Resources (mean ± SD)

Land type	Intervention group (average ha)	Control group (average ha)
Irrigated land	0.054±0.084	0.055±0.053
Non-irrigated land (terraced)	0.119±0.101	0.073±0.063
Land with trees	0.008±0.033	0.001±0.002
Rented irrigated land for farming	0.08±0.05	0.05±0.02
Rented non-irrigated land for farming	0.06±0.03	0.06±0.03

Sixty-seven percent of HH in the intervention group and 75 percent of HH in the control group do not have their own land. Approximately 34 percent of HH in the intervention group and 33 percent in the control group reported renting land. In both groups, respondents reported renting approximately 0.06 ha of non-irrigated land on average. The main reasons for renting

land in both the control and intervention groups were insufficient food and lack of enough land otherwise.

3.1.4 Income and Expenditure

Respondents were asked to estimate the average annual cash income for their HH in local currency over the past three years. In the control group, 14.5 percent had an annual income above US $364 (i.e., US $1 = Rs 96) and one percent had an income below US $52. This compares with 5.25 percent of households reporting an annual income above US $375 and 6 percent below $52 in the intervention group.

Table 6 shows the diversity in sources of cash income for 134 respondents in the intervention group and 145 respondents in the control group; the rest of the respondents did not indicate income levels. Overall, family labor—whether locally based or based on emigration—was the most common source of income for both groups. Sales of goats were also important for both groups. The HH in the intervention group may have more income derived from the sale of tubers, other vegetables, and fruits when compared to the figures for the control group.

Table 6: Estimated Household (HH) Income Sources

Source of Income	Intervention Group		Control Group	
	Number of HH (multiple responses)	Contribution to HH Income (%)	Number of HH (multiple responses)	Contribution to HH Income (%)
Sale of cereals	6	13.6%	3	18.3%
Sale of tubers	14	32.2%	3	8.0%
Sale of vegetables	23	17.8%	2	6.5%
Sale of fruit	16	13.6%	4	10.5%
Sale of goats	52	30.0%	37	19.6%
Sale of chicken/eggs	7	29.2%	3	71.3%
Local HH labor	100	66.8%	117	74.0%
Migrant HH labor	28	61.5%	48	65.3%
Rental of land/house	1	75.0%	2	39.0%
Rental of oxen/buffalo	19	34.0%	10	37.3%
Sale of dairy	5	15.0%	2	13.5%
Sale of other HH items	2	19.5%	1	21.0%

Table 7 shows the major categories of cash expenditure, also estimated over three years. Both control and intervention groups reported the majority of their spending going towards food, clothing, education, and health.

3.1.5 Labor Migration

One hundred and forty five HH members in the intervention group and 220 HH members in the control group were reported to have migrated outside of their VDCs for work. Among them, 47.7 percent and 77.3 percent, respectively, reported migrating to India (Table 8). A large portion of HH in both groups reported that such workers were away from home for more than one year. This came to 48.3 percent for the intervention group and 36.8 percent for the control group.

Table 7: Estimated Household (HH) Cash Expenditures

Cash Expenditure Category	Intervention Group		Control Group	
	Number of HH (Multiple responses)	Reported Mean Expenditure (%)	Number of HH (Multiple responses)	Reported Mean Expenditure (%)
Savings	42	6.1%	41	7.1%
Food	154	37.3%	158	36.6%
Drinks	9	15.8%	6	24.6%
Clothes	150	26.5%	155	25.3%
School/education	129	23.5%	137	20.1%
Human health	102	15.8%	119	16.5%
Farming inputs	34	8.5%	37	11.1%
Livestock inputs	40	15.1%	26	11.4%
Transport	5	17.6%	17	9.4%
Taxes	2	1.5%	2	1.5%
Rent	2	3.5%	10	11.0%
Durable goods	1	3.0%	1	8.0%
Other	14	2.5%	14	5.0%

Table 8: Household (HH) Labor Migration.

Location and Length of Stay for Migrants	Intervention Group		Control Group	
	N=145	(%)	N=220	(%)
Place of Migration				
Within the home VDC	20	13.8%	11	5.0%
Other VDCs in Nepal	46	31.7%	38	17.3%
India	69	47.5%	170	77.3%
Other countries	7	4.8%	0	0.0%
Do not know	3	2.1%	1	0.5%
Length of Stay Away from Home				
Less than 1 month	31	21.4%	19	9.6%
1 to 6 months	29	20.0%	64	29.1%
7 to 12 months	15	10.3%	56	25.5%
More than 1 year	70	48.3%	81	36.8%

3.2: Human organization, innovation, and governance

3.2.1 Involvement with Community Organizations

In the intervention group, 63 percent of HH reported that members were involved in community organizations. This was almost twice the percentage of HH reporting the same in the control group (Table 9). Among those involved in such groups, the vast majority of participants had been involved for more than a year. Eighty-five percent of HH in the intervention group

reported that the purpose of these community organizations was mainly for savings and credit purposes. In the control group, 61.2 percent of HH noted the same for the control group.

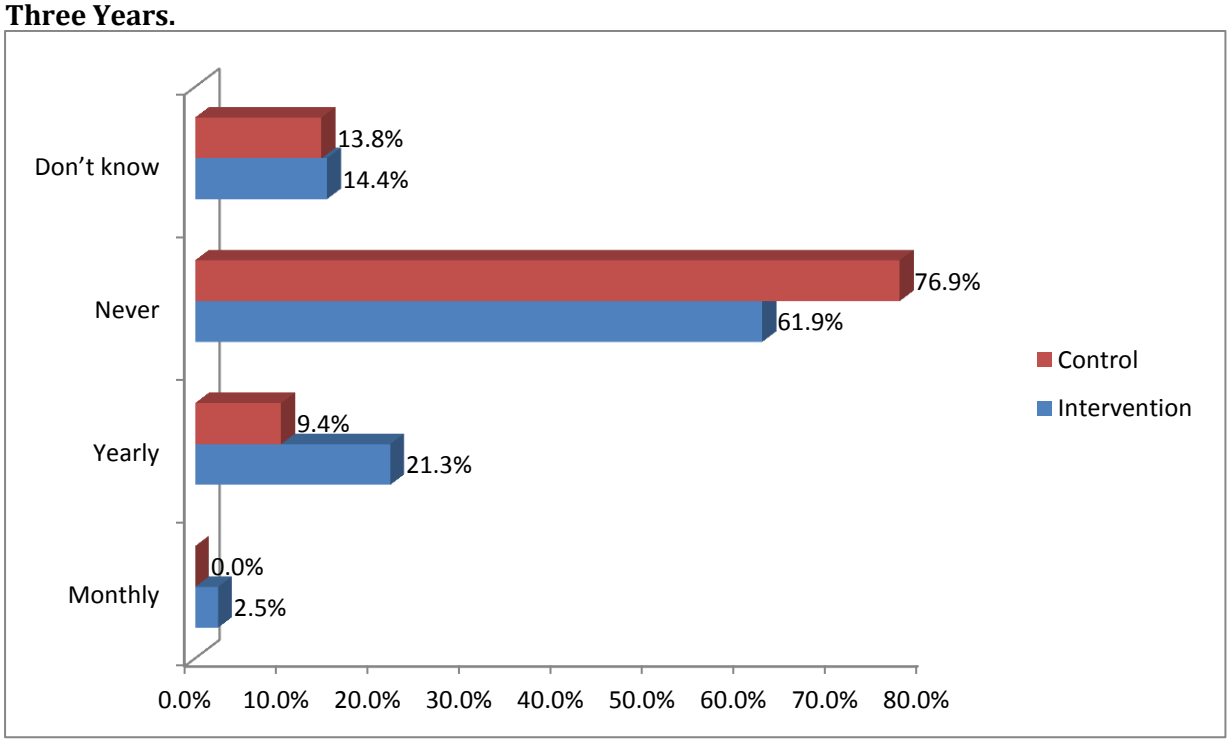
Table 9: Household (HH) involvement with community organizations.

Category	Intervention Group (%)	Control Group (%)
HH with members involved in community organizations	62.5%	35.6%
Purpose of groups		
Formal savings and credit operations	85.0%	61.2%
Informal (interpersonal) loan provision	10.7%	36.4%
Forest conservation	4.8%	24.7%

3.2.2 Information Seeking Behavior

Households were interviewed concerning the frequency with which they were innovative and sought new information regarding the improvement of livestock or crop production within the last three years. Approximately 77 percent of respondents in the control group and 62 percent of respondents in the intervention group reported that they had never sought such new information over this time frame (Figure 4).

Figure 4: Frequency of Household (HH) Heads Seeking New Information Over the Last Three Years.



Approximately 22.5 percent of HH in the intervention group and 10.7 percent of HH in the control group reported that they regularly, or sometimes, used new information to help plan in anticipation of future problems. Table 10 shows reasons that might explain these patterns.

Table 10: Reasons for Households (HH) Using/Not Using Information for Planning.

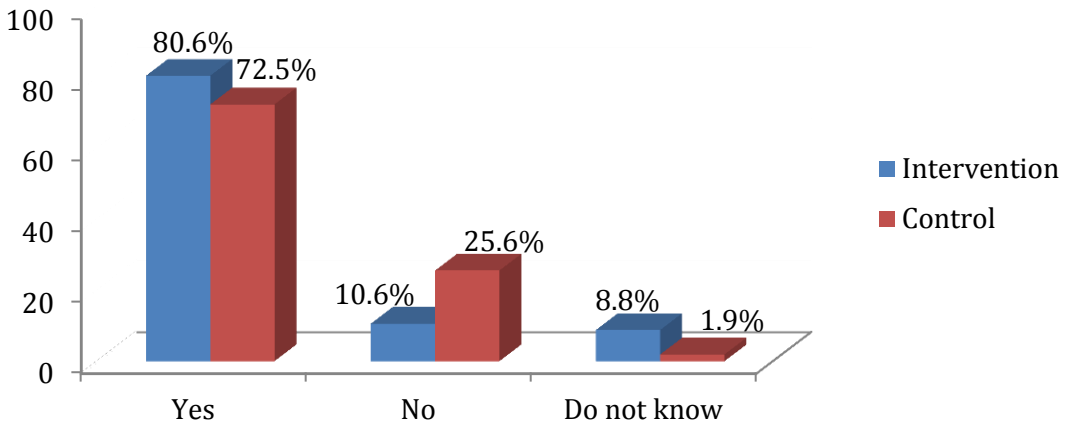
Use of Information for Planning	Intervention Group (n=160)	Control Group (n=160)
Reasons for using information to plan for future problems	n=36	n=17
Animal treatment	50.0%	29.4%
Improved livestock management	27.8%	11.7%
Improved seed management	25.0%	0.0%
Fodder and forage plantation	30.5%	23.5%
Vaccination of animals	8.3%	35.2%
Use of pesticides	11.1%	0.0%
Reasons for not using information to plan for future problems	n=124	n=143
Lack of education	36.3%	45.5%
Lack of information/awareness	64.5%	65.7%
Lack of human resources	8.1%	17.5%
Lack of access to services	25.0%	33.6%
Poor economic condition	11.3%	13.9%
Lack of own land	3.2%	2.1%
Felt no need of planning	4.0%	2.1%

3.3: Perceived changes in the environment and farming practices

3.3.1 Perception of climate change

The vast majority of respondents in both the intervention group and the control group have observed changes in weather, climate, or nature (Figure 5). Among those, 79.8 percent in the intervention group and 72.4 percent in the control group believed such changes are permanent and require them to change their traditions.

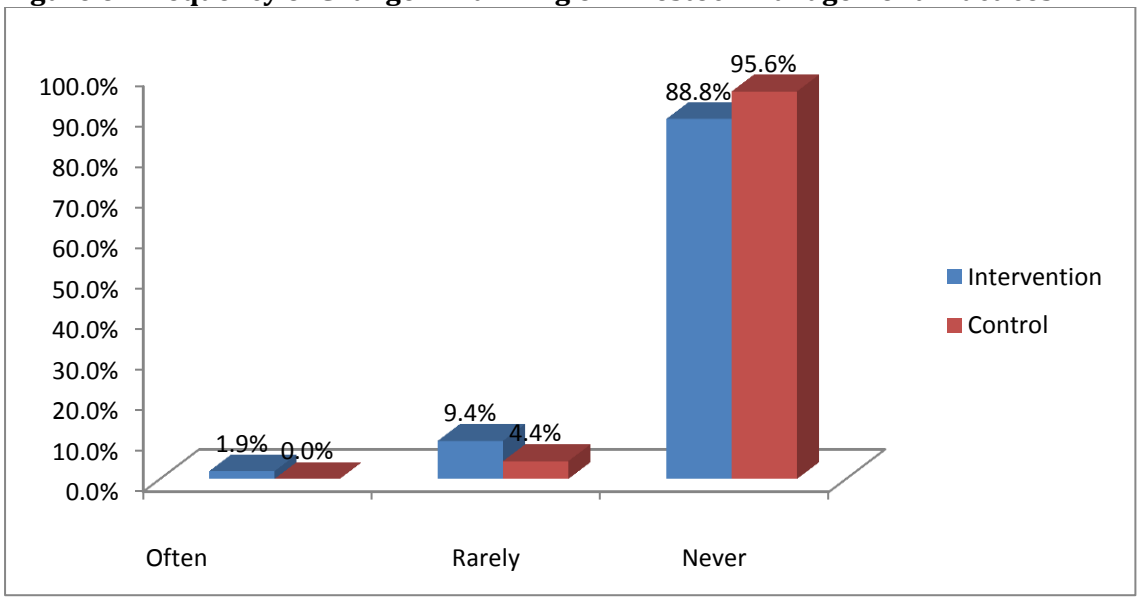
Figure 5: Percent of Respondents Observing Environmental Changes.



3.3.2. Change in livestock and farming practices

Eighty-nine percent of HH in the intervention group and 95.6 percent in the control group have not undertaken any changes in farming or livestock practices (Figure 6). Only a very few respondents could be categorized as "innovators" that regularly alter their methods.

Figure 6. Frequency of Change in Farming or Livestock Management Practices.



3.4: Use and access to water

3.4.1. Water use

Households in both the intervention and control groups used approximately 106 liters of water per day per household over the week preceding the interview. Table 11 shows that in both groups, about 30 percent of this water was used as drinking water for livestock and about 2 percent for watering the kitchen garden.

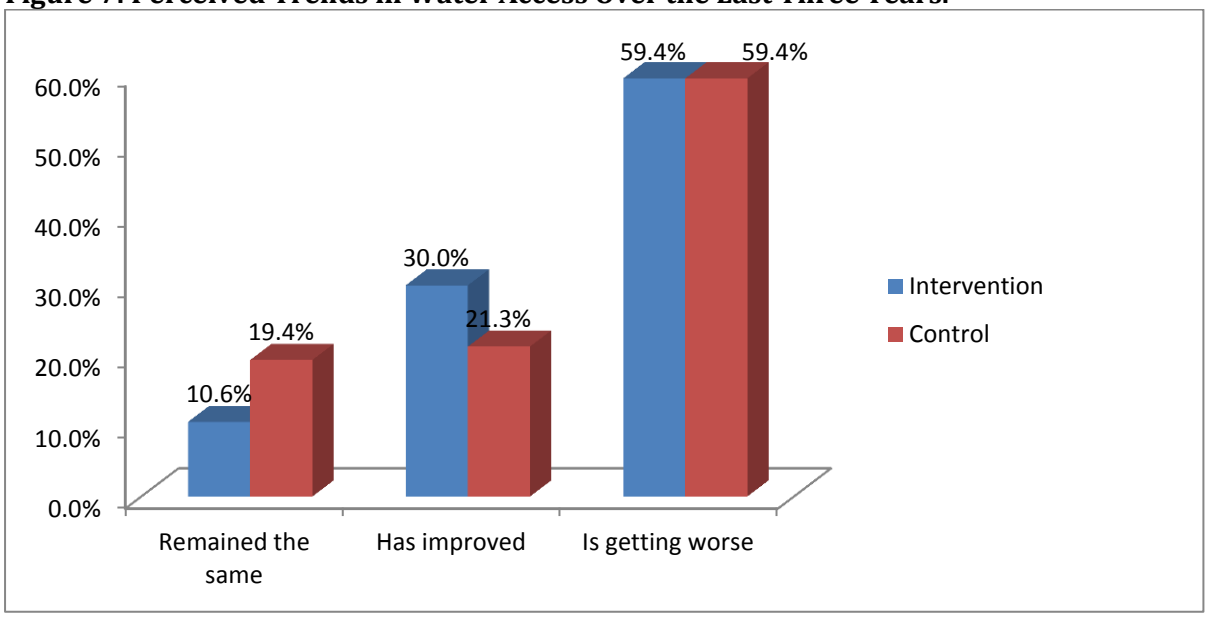
Table 11: Average Allocation for Water Use Across all Sampled Households (HH).

Water Use Categories	Intervention Group (%)	Control Group (%)
Drinking for livestock	32.2%	29.3%
Drinking for people	10.3%	9.3%
Personal washing for adults	11.4%	13.8%
Personal washing for children	8.6%	9.0%
Washing the home and utensils	17.1%	17.5%
Water for cooking	14.0%	14.7%
Water for kitchen garden	2.0%	1.7%
Other	4.4%	4.7%

3.4.2 Water access

Fifty-nine percent of respondents reported that trends in access to water sources are typically getting worse in both the intervention and the control groups. For 30 percent of the households in the intervention groups and 21 percent in the control groups, however, respondents reported that access to water sources has improved (Figure 7). This interesting finding was apparently stimulated—at least in part—by the initial PRA exercise that raised awareness about water supply problems. Most community water taps lacked caps, and as a result of awareness-raising taps were capped. This reduced wastage and improved water supply for some HH.

Figure 7: Perceived Trends in Water Access Over the Last Three Years.



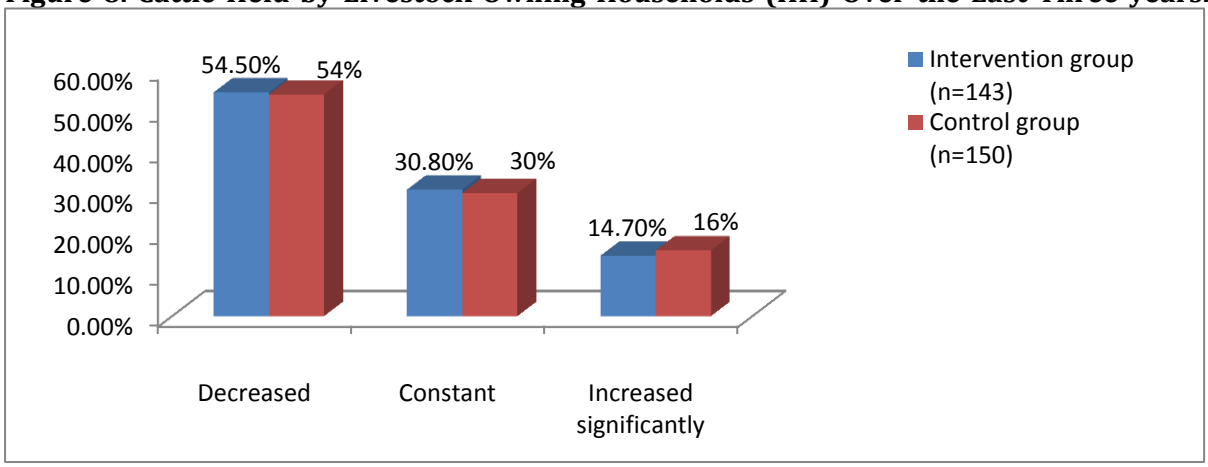
3.5: Livestock and fodder

3.5.1 Livestock inventory

Eighty-nine percent of HH in the intervention group and 94 percent of HH in the control group reported owning livestock. In the intervention group, the HH that owned livestock had three to four goats, two to three cattle, two draft oxen and one buffalo, on average. In the control group, livestock ownership was similar; the average HH had two to three cattle, two draft oxen, and two goats. Overall, very few HH owned chickens or sheep.

Over the past three years, 54 percent of all HH that owned livestock have experienced a decrease in cattle inventory (Figure 8). Regarding livestock health, the majority of control (56.7 percent) and intervention (63.6 percent) HH owning livestock have seen no changes in livestock health status. About 22 percent of HH in the intervention group and 26.7 percent in the control group reported a decline in livestock health.

Figure 8. Cattle Held by Livestock-Owning Households (HH) Over the Last Three years.



3.5.2 Feed supply

Concerning trends in feed supplies, 52 and 62 percent of HH that owned livestock in the intervention and control groups, respectively, reported that livestock feed supply has decreased over the last three years (Figure 9). Lack of fodder was listed as a primary problem affecting overall livestock production in both groups. Table 12 summarizes overall livestock production problems listed by respondents. Respondents reported that grazing areas have been over-run by non-forage species, and presumably these are weeds.

Figure 9: Trends in Feed Supplies Over the Last Three Years for Livestock-Owning Households (HH)

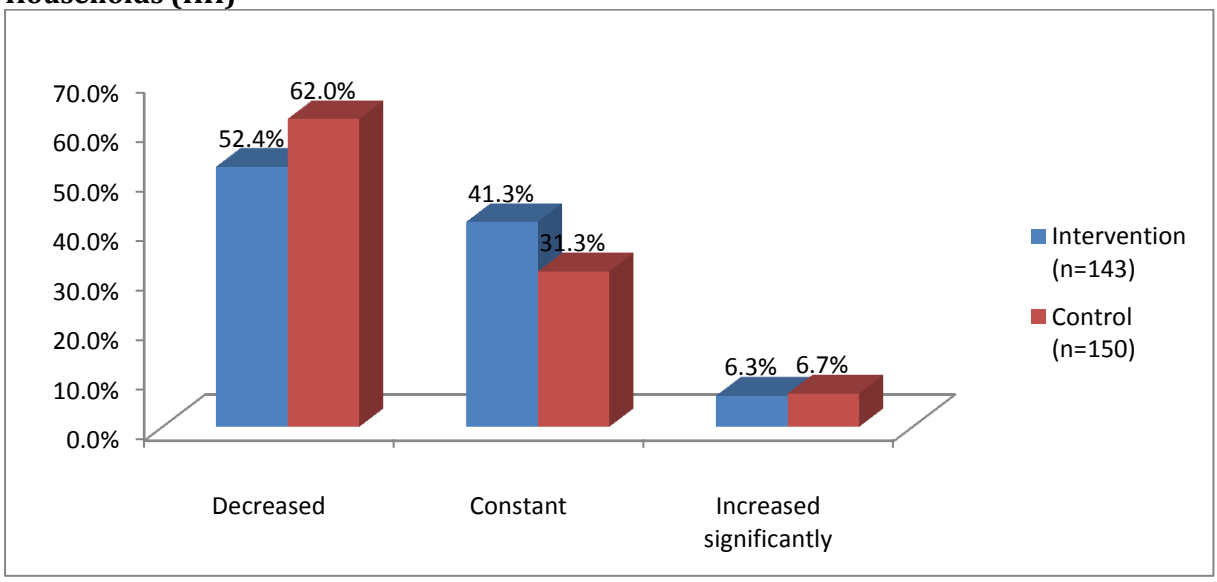


Table 12: Most Important Livestock Production Problems Across All Sampled Households (HH)

Problems	Intervention Group (n=160)	Control Group (n=160)
Lack of fodder and forest resources (cut and carry feeds)	78.7%	88.7%
Lack of manpower	36.8%	44.3%
Lack of animal shelters	24.3%	31.8%
Lack of water	37.5%	29.3%
Lack of improved breeds	6.2%	5.6%
Animal diseases	9.0%	16.8%
Lack of grazing resources	37.0%	66.8%

3.5.3 Goat production

Sixty-four percent of HH in the intervention group and 53 percent in the control group owned goats. Among all goat-owning HH, goats were used mainly for income generation, fertilizer production, other household uses, or as a meat supply (Figure 10). Only a small percentage of HH used goats for breeding purposes. Over the past three years, the average HH sold about 2.5 goats per year in the control group and 3.0 goats per year in the intervention group.

Seventy-four and 71 percent, respectively, of HH in the intervention and control groups were interested selling more goats. Table 13 summarizes the factors that most limit goat production or sale among all HH.

Figure 10: Purposes for Goat Raising Among Households Producing Goats.

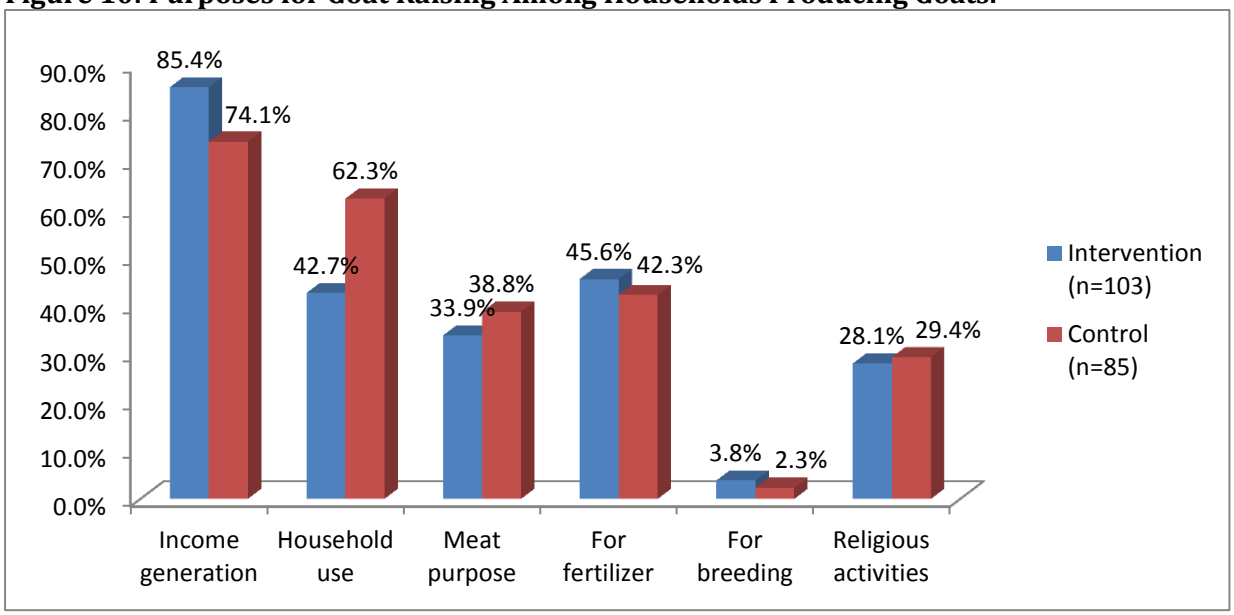


Table 13: Interest in Goat Production Across All Sampled Households (HH).

Category	Intervention Group (n=159)	Control Group (n=159)
HH interested in selling more goats	73.8%	71.3%
HH not interested in selling more goats	25.6%	28.8%
HH with no opinion on selling more goats	0.01%	0.01%
Reasons for interest in selling more goats	(n=118)	(n=114)
Home consumption	44.9%	55.3%
Income generation	80.5%	80.7%
Meat production	18.6%	7.8%
Fertilizer production	25.4%	16.6%
Develop commercial goat farming	4.2%	1.7%
Goat breeding	4.2%	0%
Reasons for non-interest in raising more goats	(n=41)	(n=45)
Lack of sufficient labor	43.9%	26.7%
Lack of reliable goat pricing	26.8%	6.7%
Lack of improved goat breeds	36.5%	73.3%
Shortage of fodder and grazing	26.8%	17.8%
Lack of animal shelters	4.8%	6.7%

3.6: Cultivated crops and farming methods

3.6.1 Crop Production

In both the intervention and control groups rice was planted by 91 percent of HH during the summer season and wheat by 85 percent of the farmers during the winter. This was followed by planting of millet (a summer relay-crop with maize), barley (a winter crop in selected plots) and potato (grown year-round in selected plots). Twenty-six percent of HH in the intervention group and 16 percent in the control group planted potatoes (Table 14).

Households in both the control (81.2 percent) and intervention (67.9 percent) groups reported to use most of their non-irrigated terraces for wheat cultivation. Households in the control group reported a higher percentage of non-irrigated land under fallow when compared to that for the intervention group.

Table 14: Crop Production Patterns Across All Sampled Households (HH)

Crop Types	Intervention Group (Multiple responses)		Control Group (Multiple responses)	
	Number of HH	Average cultivated land area (%)	Number of HH	Average cultivated land area (%)
Percent area of each crop type planted on irrigated land				
Rice	91	91.0%	135	91.5%
Maize	8	19.6%	13	20.0%
Millet	10	32.0%	16	35.3%

Barley	26	28.0%	54	23.8%
Wheat	90	81.9%	135	88.6%
Potato	37	25.7%	16	15.7%
Others	15	7.5%	31	10.2%
Percent area of each crop type planted on non-irrigated terraces				
Rice	122	40.7%	100	42.3%
Maize	110	19.0%	89	21.9%
Millet	143	44.8%	133	61.0%
Barley	118	31.4%	80	27.3%
Wheat	143	67.9%	141	81.2%
Potato	59	28.7%	46	17.6%
Fallow	5	13.6%	10	62.5%
Others	54	13.5%	26	8.9%

Very few HH planted fruit trees in either the intervention or control groups. For example, banana and orange trees were planted by 4 to 5 percent, respectively, of the intervention HH. Less than one percent of control HH grew fruit trees, and these were all banana.

Regarding the sources of crop seeds and fruit-tree cuttings, less than one percent of HH in the intervention group and no HH in the control group reported obtaining new materials from off-farm sources such as governmental or non-governmental agencies.

3.6.2: Post-harvest losses

The percent post-harvest losses per crop for HH in the intervention group was highest for millet at 7 percent, followed by rice, wheat, barley, and potato (Table 15). In the control group, HH losses were highest for rice and wheat at about 7 percent each, followed by barley and millet.

Table 15: Estimated Post-Harvest Losses Across All Sampled Households (HH)

Crop Type	Intervention Group (multiple responses)		Control Group (multiple responses)	
	Number of HH	Average post-harvest loss (%)	Number of HH	Average post-harvest loss (%)
Rice	147	5.5%	153	6.9%
Maize	110	2.7%	97	1.4%
Millet	143	7.0%	143	4.0%
Barley	121	4.4%	95	5.9%
Wheat	149	5.5%	155	7.5%
Potato	82	3.8%	54	2.8%
Others	60	1.1%	39	2.3%

3.6.3: Irrigation methods

The majority of HH in both intervention and control groups reported using the traditional methods of *Kullo* (non-concrete canal) for irrigation (Table 16). Thirty-eight percent and 13

percent, respectively, of control and intervention groups reported not using any newer methods of irrigation on their irrigated land. No respondents from either group said they used any method of irrigation on their terraced land. A few reportedly used water from *Kullo* for their tree crops.

Table 16: Irrigation Methods Across All Sampled Households (HH)

Category	Intervention HH (n=160)	Control HH (n=160)
On Irrigated Land		
Kullo (Canal)	59.4%	86.3%
River	0.0%	1.3%
Nahar (improved, bigger canal)	0.6%	0.0%
Pipe	1.3%	0.0%
Rainfall	1.3%	0.0%
None	37.5%	12.5%
On Terraces		
Rainfall	62.5%	80.0%
Kullo (Canal)	0.0%	4.4%
None	37.5%	15.6%
On Tree Crops		
Rainfall	6.9%	0.0%
Kullo (Canal)	0.6%	0.0%
None	92.5%	100.0%

3.6.4 Cultivation and soil management

The majority of HH in both the control and intervention groups reported using animal power to till irrigated land and terraces (Table 17). At tree-crop sites, however, planting or tillage was done by human labor when a method was given.

Sixty-three percent of intervention HH and 88 percent of control HH reported using human labor to weed irrigated land; 96 percent and 97 percent, respectively, reportedly did the same for weeding on terraces (Table 18). At the tree-crop sites the weeding was done by a minority of HH in either group, with most other not weeding at all.

Table 17: Planting and Tillage Methods Across All Sampled Households (HH).

Category	Intervention HH (n=160)	Control HH (n=160)
Use of Animal Power on Irrigated Land		
Yes	62.5%	88.1%
No	37.5%	11.9%
Use of Animal Power on Terraces		
Yes	96.3%	96.9%
No	3.8%	3.1%
Use of Human Labor on Tree Crops		
Human labor	6.3%	0.6%

No response/no method reported	93.8%	99.4%

Table 18: Weeding Methods Across All Sampled Households (HH).

Category	Intervention (n=160)	Control (n=160)
Use of Human Labor on Irrigated Land		
Yes	63.1%	88.1%
No	36.9%	11.9%
Use of Human Labor on Terraces		
Yes	96.3%	96.9%
No	3.8%	3.1%
Use of Human Labor on Tree Crops		
Human labor	7.5%	0%
non-response/no method reported	92.5%	100%

Regarding the application of manure on cropland, the vast majority of both groups reported that they used manual methods (Table 19). Manuring was rarely practiced for tree crops. The traditional practice of mulching was reportedly used by a minority of HH from both the intervention and control groups. Mulching is the practice of covering the soil with compost after planting seed. Twenty-eight percent of intervention HH and 27 percent of control HH said they used manure for mulching on irrigated land. On the terraces 35 percent of intervention HH and 27 percent of control HH used manure for mulching. Fodder was also used for mulching on the terraces by a few respondents. Mulching was rarely done for tree crops. See Table 20 for details. Regardless of whether cropland is irrigated or non-irrigated, the vast majority of HH in either the intervention or control groups practice fallowing (Table 21). In contrast, fallowing was not practiced for tree crops.

Table 19: Manuring and Composting Methods Across All Sampled Households (HH).

Category	Intervention (n=160)	Control (n=160)
Use of Human Labor on Irrigated Land		
Yes	63.1%	86.9%
No	36.9%	13.1%
Use of Human Labor on Terraces		
Yes	96.3%	96.3%
No	3.8%	3.8%
Use of Human Labor on Tree Crops		
Yes	7.5%	0.6%
No	92.5%	99.4%

Table 20: Mulching Methods Across All Sampled Households (HH).

Category	Intervention (n=160)	Control (n=160)
On Irrigated Land		
Manuring	27.5%	26.3%
No response/no method reported	72.5%	73.8%
On Terraces		
Manuring	35%	25.6%
Fodder	0.6%	2.5%
No response/no method reported	64.4%	71.9%
On Tree Crops		
Manuring	7.5%	0.6%
No response/no method reported	92.5%	99.4%

Table 21: Fallowing of Cropland Across All Sampled Households (HH).

Category	Intervention (n=160)	Control (n=160)
On Irrigated Land		
Fallowing practiced	96.9%	99.4%
Fallowing not practiced	3.1%	0.6%
On Terraced Land		
Fallowing practiced	88.1%	90.6%
Fallowing not practiced	11.9%	9.4%
On Tree Crops		
Fallowing practiced	0%	0%
Fallowing not practiced	100%	100%

Harvesting of crops in both the intervention and control groups was universally done using sickles. For tree crops harvesting is done by hand. These data are not illustrated.

Few HH reported use of any methods for pest control on croplands (Table 22). When pest control was attempted, a variety of local materials were used including ash from burning firewood and sprays made from local plant materials. Sometimes cow urine is used.

Neither of the groups reported use of improved farming methods. Such methods, for example, could, include the use of improved seeds, chemical fertilizers, or novel soil management techniques. See Table 23 for details.

Table 22: Methods of Pest Control Across All Sampled Households (HH).

Category	Intervention (n=160)	Control (n=160)
On Irrigated Land		
Ash spray	15%	1.3%
Timur water (Sichuan pepper)	0.6%	1.3%
Pina manure (a by-product of oil seeds)	1.3%	0%
Khiro (indigenous herb)	1.9%	1.9%
Sprinkle water	0.6%	0.6%
Cow urine	0%	0.6%
Guava spray (fruit and leaf extract)	1.3%	1.3%
Bojo (indigenous herb)	0%	0.6%
No use of pest control/no response	79.4%	92.5%
On Terraces		
Ash spray	19.4%	2.5%
Unidentified fruit	3.8%	2.5%
Pina manure	1.3%	0%
Local medicinal seed	1.3%	1.3%
No use of pest control/no response	73.8%	91.9%
On Tree Crops		
Bojo (indigenous herb)	1.9	0
No use of pest control/no response	98.1	100

Table 23: Incidence of Improved Farming Practices Across All Sampled Households (HH).

	Intervention HH (N=160)	**Control HH (N=160)**
No improved methods of irrigation on:		
Irrigated land	148 (93%)	155 (97%)
Terraces	137 (86%)	150 (93%)
Tree crop sites	114 (71%)	118 (74%)
No improved methods of planting or tillage on:		
Irrigated land	149 (93%)	156 (98%)
Terraces	158 (99%)	159 (99%)
Tree crop sites	114 (71%)	119 (74%)
No improved methods of weeding on:		
Irrigated land	149 (93%)	156 (98%)
Terraces	158 (99%)	159 (99%)
Tree crop sites	116 (73%)	118 (74%)
No improved methods of mulching on:		
Irrigated land	138 (86%)	140 (88%)
Terraces	144 (90%)	143 (89%)
Tree crop sites	111 (69%)	118 (74%)
No improved methods of fallowing on:		

Irrigated land	111 (69%)	118 (74%)
Terraces	121 (76%)	126 (79%)
Tree crop sites	111(69%)	118 (74%)
No improved methods of crop harvesting on:		
Irrigated land	149 (93%)	156 (98%)
Terraces	157 (98%)	159 (99%)
Tree crop sites	113 (71%)	119 (74%)
No improved methods of pest control on:		
Terraces	136 (85%)	123 (77%)
Tree crop sites	116 (73%)	119 (74%)

3.7: Food, health, and climate change adaptation

3.7.1 Food and human health

About 84 percent of both intervention and control group HH reported that the lack of a local clinic or health resources was the major problem in their VDCs (Figure 11). Regarding food security, lack of nutritious food was reported as a problem by 48 percent of intervention HH and 62 percent of control HH. Figure 12 illustrates the priority interventions desired by respondents given the climate will become warmer and drier. Priorities include local health services, climate-suitable seed, improved food quality, and greater access to water for both people and crop production.

Figure 11: Most Important Food or Health-Related Problems Reported by Respondents.

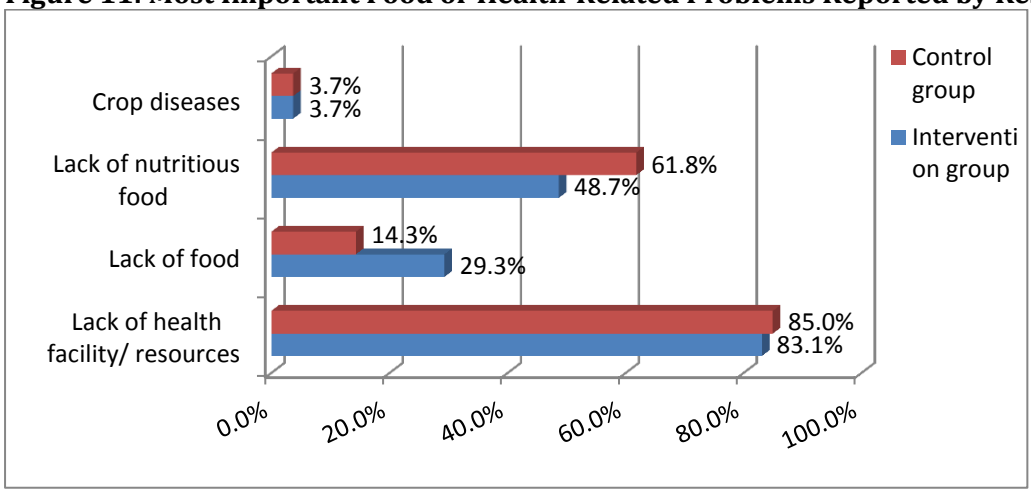
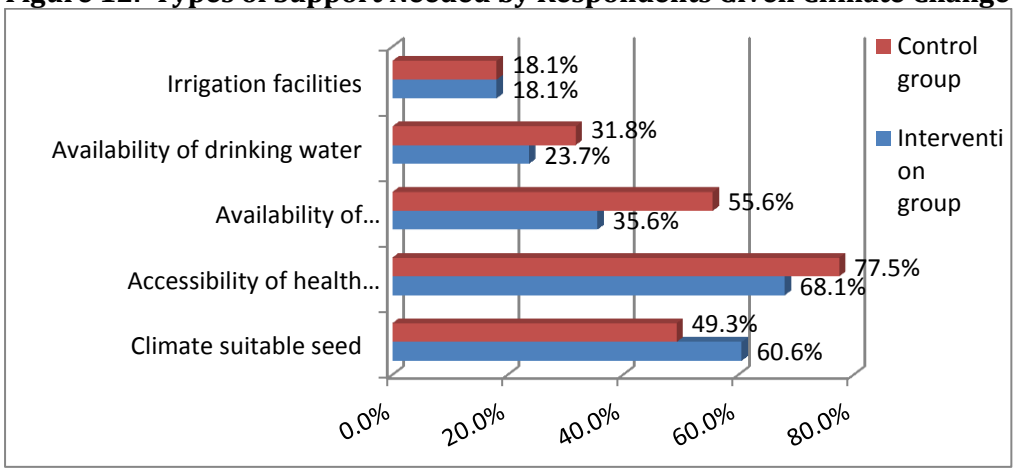


Figure 12. Types of Support Needed by Respondents Given Climate Change Trends.



4.0 Summary and Conclusions

These data provide a snapshot of the people, activities, resources, and problems that characterize VDCs in Bajura District. Overall, the data indicate that Brahmins and other privileged classes comprise about two-thirds of the population in our four VDCs, with the under-privileged Dalits making up the remainder. Illiteracy is moderate (around 24%), and most residents gain income from off-farm employment and sales of crops, livestock, and livestock products. Income levels are low. Households often send migrants to India and elsewhere in Nepal to gain income that can be sent home. On the social side, participation in community organizations is significant overall, but varies markedly among the four VDCs.

The data suggest that out-migration for work outside of Nepal occurs at a higher frequency for households in the control VDCs (77 percent) when compared to households in the intervention VDCs (47 percent), but this can only be confirmed by further statistical analysis. The source of this supposed variation remains unclear; a difference may be driven by variation in household contacts. Although seasonal migration to India is the norm for districts like Bajura, the data suggest that around 37 to 48 percent of migrants are staying out for more than one year. This is an indicator that on-farm earnings are insufficient to support families, and that there is a lack of local, off-farm employment opportunities.

A significant number of surveyed households reported that they had members who had joined a local community group. This also appeared to vary from the intervention VDCs (63 percent) versus the control VDCs (36 percent), but this can only be confirmed by statistical analysis. This apparent difference between intervention and control VDCs may be due to a lingering influence of previous development projects. It is notable that the majority of the community groups deal with savings and credit. Given the occurrence of such groups, it is a bit surprising that the overall average level of savings per month appears very low at NPR 7.00. While savings and credit groups are very important, they may not provide community forums for sharing information and learning.

In terms of access to land, crops, and livestock, patterns are typical of the region. The majority of survey respondents must rent farm land, and plot sizes are small. This confirms findings from CBS (2011) where it is stated that the average landholding per household in Bajura is 0.41 hectares, of which 23 percent is irrigated. Although our surveyed households commonly have high access to irrigated land, the amount of irrigated land is minimal.

Cereal grains dominate the crop portfolio, with rice grown under traditional irrigation in valley bottoms and wheat, barley, and other grains grown on non-irrigated terraces. Tree crops are important in some situations. Tillage typically involves use of oxen power, and all other cultivation tasks (i.e., weeding, manuring, composting, mulching, etc.) are carried out by hand. Fallowing of croplands is a common practice. Traditional means are used to conduct pest control for crops. Nearly all households own hoofed livestock, but the inventory per household is usually less than 10 head in total. This includes goats, buffalo, and cattle.

Goats are a multi-purpose species that are primarily used to generate income and for home consumption. Chickens and their eggs are often important items to sell. Goats are held by over 70 percent of all households, and the majority of all survey respondents are interested in increasing the number of goats they can sell. This corresponds with findings from formative

research previously conducted here (LCC, 2012) when farmers reported they were reducing the numbers of larger stock because they were becoming more difficult to maintain due to the decreasing fodder grasses, water, and pasture land and limited alternative sources of animal feeds.

The majority of respondents recognize that the weather patterns have been changing to warmer, drier conditions. They feel these changes are long-term, but there was no awareness of "climate change" as a general phenomenon. The respondents generally perceive declines in livestock fodder supplies, cattle inventory, and water for both people and animals.

Perhaps the most striking observation, overall, is how insular the farming systems are. There appears to be little or no innovation beyond the traditional practices, and we speculate that this is related to the high degree of physical and socio-cultural isolation that characterizes VDCs in this region. Crop varieties and livestock breeds are almost exclusively traditional, and farmers clearly admit that they do not seek new information to improve their agricultural practices; they also rarely engage in strategic planning.

When asked what the priority problems are, overall the survey respondents noted: (1) A need for human-health services; followed by (2) a lack of nutritious food, and (3) a lack of drinking water. These results differed somewhat from priorities obtained during the previous year using Participatory Rural Appraisals (PRAs) in the intervention sites. Those priorities included a need to: (1) Improve water resources; (2) mitigate declines in crop yields; (3) commercialize livestock production (via goat production); and (4) increase the scope for households to be competitive for off-farm employment. Given the priority problems from the survey as well as the specter of climate change, the priority interventions requested included: (1) Establishment of local health services; (2) provision of climate-suitable seeds; (3) improved local production of more-nutritious foods, and (4) improved access to drinking water.

It is notable that although these communities are aware of changing weather patterns and recognize that adaptation in agricultural practices is required, few (if any) have actually attempted any innovative changes. The PRA results from the previous year revealed that traditional seeds and seedlings are repeatedly being used on the same land without proper management of compost, which may be contributing to declines in production.

In conclusion, the four VDCs appear reasonably similar to each other based on these preliminary findings. This justifies the overall research design for our project, whereby paired VDCs will be experimentally compared and contrasted via baseline and endline surveys that assess the effectiveness of interventions to help communities adapt to climate change and mitigate poverty. This conclusion may be verified by a rigorous statistical analysis of the data that is now underway at USU.

5.0 References

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Annex-A
Questionnaire of Baseline Survey

BASELINE HOUSEHOLD (HH) SURVEY FOR BAJURA
Building Adaptive Capacity for Climate Change and Poverty Mitigation

Consent

Are you willingness to be participated in this survey?

Yes …… 1 (Continue Interviewing)

No …… 2 (Terminate the interview)

Form Number within the Cluster ☐☐

HH Identification Number

Name of VDC Cluster _____ Code ☐☐

Ward Number ☐☐

Housdhold Number ☐☐

Q1. Name of tole/village _____

Q2. Survey Group Intervention Group 1 Control Group 2

Q3. Name of Enumerator: _____ Code ☐☐

Q4. Date of interview *(day/month/year)*: ☐☐ ☐☐ ☐☐☐☐

Q5. Name of Supervisor: _____ Code ☐☐

Q6. Date of Supervise *(day/month/year)*: ☐☐ ☐☐ ☐☐☐☐

Q7. Interviewee(s) are

Male head only 1 Female head only 2 Both male and female heads 3

Q8. Age of an Interviewee(s)

Age of Male head Age of Female Head

(If the interviewee is conducted with one HH head only, then write ☐☐ ***code '97' in next box)*** ☐☐

SECTION 1: General Information

Q.No.	Question and Filters	Coding Categories	Skip to
101	Household Ethnic Group ***(See coding list)***[1]	Dalit ..... 1 Disadvantage Janajatis ..... 2 Disadvantage Terai non-dalit caste group ..... Religious minorities ..... 3 Relatively advantaged janajatis ..... 4 Upper caste group ..... 5 Other (Specify)_____ 6	
102	Was a HH member directly involved in the HKI PRA activity here?	Yes ..... 1 No ..... 2 Don't know 98	

[1] Detail list of Ethnic Groups is available in a hard copy

103. Household Composition: How many people reside all together in this household *(who have resided at, or are food-dependent on, this household?)*

Line No	103.1. Name of HH member *(Please start listing from elder person of the household)*	103.2. Age (Completed Years)	103.3 Gender M= 1 F=2	103.4. Marital Status *(if Age >=10 years) See codes below*	103.5. Education level completed *(if Age>= 3 years) See codes below*	103.6. Present/ Absent in HH Present = 1 Absent = 2 ***If absent, Need to fill Sec 8, Migrants at last***	103.7. Has this person ever had an off-farm, wage job *(if Age >=10 years)* Yes = 1 No = 2 → 103.9	103.8. Type of the current job	103.9. Has this person ever had specialized job or business training Yes = 1 No = 2 → 103.11	103.10. specialized job or business training	103.11. Does this person own a mobile phone? Yes = 1 No = 2
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											

Codes:

Q103.4. Marital Status

Currently married 1
Divorced/permanently separated 2
Widowed 3
Never married 4

Q103.5. Education level completed

Primary (1-5 grade)....1
Middle (6-8 grade)....2
High school/Secondary (9-10 grade).....3
Sr. Secondary/ intermediate (11-12 grade).....4
Graduate & above....5
Literate but no schooling 6
Illiterate 7

SECTION 2: Land Resources, Annual income and expenditure

Q.No.	Question and Filters	Coding Categories	Skip to
201	Do the Household own land resources?	Yes ..... 1 No ..... 2 →	205
202	Types of land **(Multiple Response Possible)**	Irrigated valley bottoms ..... 1 Non-irrigated terraces ..... 2 Other land or accessed for tree crops 3	
202.1	How much land resources this household owned for **Irrigated Valley bottoms**?	Pathi ☐☐ ***(Please fill '98' in boxes, for Don't Know Response)***	
202.2	How much land resources this household owned for **Non-irrigated terraces**?	Pathi ☐☐ ***(Please fill '98' in boxes, for Don't Know Response)***	
202.3	How much other land resources this household owned or **Accessed for tree crops**?	Pathi ☐☐ ***(Please fill '98' in boxes, for Don't Know Response)***	
203	In the past three years, on average, did the household able to **utilize irrigated valley bottoms**	Yes ..... 1 → No 2	204
203.1	Reasons for not being able to utilize **irrigated valley bottoms** in the past three years **(List Reasons)**	_____ _____ _____ _____ _____	
204	In the past three years, on average, did the household able to utilize **Non-irrigated terraces**	Yes ..... 1 → No 2	205
204.1	Reasons for not being able to utilize **Non-irrigated terraces** in the past three years **(List Reasons)**	_____ _____ _____ _____ _____	
205	Does this household rent or use other families' land for farming	Yes ..... 1 No ..... 2 →	206

Q.No.	Question and Filters	Coding Categories	Skip to
205.1	How much area of **Irrigated Valley bottoms** this household has rented for farming ***(Please fill '98' in boxes, for Don't Know Response and '97' if not rented Irrigated Valley bottoms)***	Pathi ☐☐	
205.1.1	Reasons of renting **Irrigated Valley bottoms** **(Skip if not rented)**	_____ _____ _____ _____	
205.2	How much area of **Non-irrigated terraces** this household has rented for farming ***(Please fill '98' in boxes, for Don't Know Response and '97' if not rented Non- Irrigated terraces)***	Pathi ☐☐	
205.2.1	Reasons of renting **Non-irrigated terraces** **(Skip if not rented)**	_____ _____ _____ _____	
206	What was the average annual total cash income (NRs) for this HH over **past 3 years**	< 5,000 ..... 1 5,001 – 10,000 ..... 2 10,001 – 15,000 ..... 3 15,001 – 20,000 ..... 4 20,001 – 25,000 ..... 5 25,001 – 30,000 ..... 6 30,000 – 35,000 ..... 7 Exceeds range in ..... 8 Don't remember/know ..... 98 Precise value estimated _____	

Q.No.	Question and Filters	Coding Categories	Skip to
206.1	Specify the main sources of HH cash income for Q206 by percentage **(Sell ….. or from ……)**	a. Grain_____% b. Tubers_____% c. Vegetables_____% d. Fruits_____% e. Goats_____% f. Chicken/egg_____% g. Local labor_____% h. Migrant labor_____% i. Borrowing_____% j. Rental land/house_____% k. Oxen/buffalo_____% l. Gifts_____% m. Sale of Dairy_____% n. Forage_____% o. Wood products_____% p. Handicrafts_____% q. Household items_____% **r.** Other (Specify) _____ % s. Other (Specify) _____ % **Sum 100%**	
206.2	Specify the average annual pattern of HH cash expenditure **(percentages)**	a. Savings _____% b. Food _____% c. Drink_____% d. Clothes_____% e. School/educational_____% f. Human Health_____% g. Farming Inputs_____% h. Livestock Inputs_____% i. Transport_____% j. Taxes_____% k. Rent_____% l. Durable Goods_____% **m.** Other (Specify) _____ % n. Other (Specify) _____ % **Sum 100%**	
207	If money is spent on **Farming Inputs**, what has been purchased ***(Rank most important first)*** ***(Skip this question if Response in Q206.2, Farming inputs =0%)***	1. _____ 2. _____ 3. _____ 4. _____ 5. _____	

Q.No.	Question and Filters	Coding Categories	Skip to
208	If money is spent on **Livestock Inputs**, what has been purchased ***(Rank most important first)*** ***(Skip this question if Response in Q206.2 Livestock inputs =0%)***	1. _____ 2. _____ 3. _____ 4. _____ 5. _____	

SECTION 3: Human Organization and Governance

Q.No.	Question and Filters	Coding Categories	Skip to
301	Do any adult HH members belong to an organized self-help group	Yes ..... 1 No ..... 2 →	302

Please copy and verify line number of the adult household members, belong to an organized self help group, with Section 1: Roster

301.1 Line No of HH member	301.2. Group Name	301.3. Length of Time Since Joining *('00' for less than a week)*	301.4. Purpose of the Group? *(List purpose)*	301.5. Group Function Level
		☐☐ Weeks ☐☐ Months ☐☐ Years	1. _____ 2. _____ 3. _____ 4. _____ 5. _____	Poor ..... 1 Average ..... 3 Good 5
		☐☐ Weeks ☐☐ Months ☐☐ Years	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____	Poor ..... 1 Average ..... 3 Good 5
		☐☐ Weeks ☐☐ Months ☐☐ Years	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____	Poor ..... 1 Average ..... 3 Good 5
		☐☐ Weeks ☐☐ Months ☐☐ Years	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____	Poor ..... 1 Average ..... 3 Good 5

Q.No.	Question and Filters	Coding Categories	Skip to
302	How frequently do the HH members seek *new*	Daily 1	

	information to improve HH livestock or crop production over the past 3 years	Weekly ..... 2 Monthly ..... 3 Yearly ..... 4 Never ..... 5 Don't know 98	→ 304
303	Specify the sources where new information is discovered	Other farmers ..... 1 Government experts ..... 2 Schools ..... 3 NGO experts ..... 4 None ..... 5 Others (Specify)_____ 96 Don't know 98	
304	Does this HH use current information to plan for *future problems*	Yes, regularly ..... 1 Yes, sometimes ..... 2 Never 3	→ 304.2
304.1	If planning is **USED**, please describe _____ _____ _____		Go to 305
304.2	If planning is **NOT USED**, explain why _____ _____ _____		
305	Has this HH observed changes in weather, climate, or nature in recent years that appear unusual?	Yes ..... 1 No ..... 2 Don't know 98	→ 307
306	What best describes HH beliefs	Changes are temporary and do not require us to change our traditions ..... 1 Changes are permanent and do require us to change our traditions ..... 2 It is not clear if changes are temporary or permanent—no change in traditions is needed yet 3	
307	Over the past 3 years, has the HH made big changes in farming or livestock practices	Yes, often ..... 1 Yes, rarely ..... 2 No, never 3	→ 308
307.1	What changes have been made in farming or livestock practices over the past 3 years **What changes** **Why ?**		

	_____ _____ _____ _____ _____	_____ _____ _____ _____ _____	
308	Does this HH save money?	Yes ..... 1 No ..... → 401 Don't know ..... → 401 2 98	401
308.1	Does this HH save money in a formal banking institution	Yes ..... 1 No ..... 2 Don't know 98	
309	Does this HH have reliable access to credit	Yes ..... 1 No ..... 2 Don't know 98	

SECTION 4: Household Water ***(include only water that is carried or collected for use by people, animals under confinement, or for irrigation of home gardens)***

Q.No.	Question and Filters	Coding Categories	Skip to
401	How much HH water, on average, have you used ***per day*** over the past week?	_____ liters	
401.1	Specify uses of this water by percentages	a. Drinking for livestock _____ % b. Drinking for people _____ % c. Personal washing for Adults _____ % d. Personal washing for children _____ % e. Washing the home and utensils _____ % f. Water for cooking _____ % g. Water for gardening _____ % h. Other (Specify) _____ % i. Other (Specify) _____ % **Sum 100%**	
402	What is the trend for HH *access to such water **sources*** over the past 3 years?	It has stayed the same ..... 1 It is improving ..... 2 It is getting worse ..... 3 Don't know 98	
403	**Considering the past week, specify (circle) frequency of hand washing** a. Mother: 0/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 2/day 3/day Other (Specify) _____/wk _____/day b. Youth (ages 11-16 yr): 0/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 2/day 3/day		

	Other (Specify) _____/wk _____/day c. Child(ages 5-10 yr): 0/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 2/day 3/day Other (Specify) _____/wk _____/day d. Child (ages <5 yr): 0/wk 1/wk 2/wk 3/wk 4/wk 5/wk 6/wk 1/day 2/day 3/day Other (Specify) _____/wk _____/day
404	When do household members usually wash their hands ***(Rank list from most important to less important)*** 1. _____ 2. _____ 3. _____ 4. _____ 5. _____

SECTION 5: Livestock Production

Provide livestock information below:

	Species or Type:	a. Cattle	b. Draft Oxen	c. Buffalo	d. Goats	e. Sheep	f. Chickens	Other	Other
501	**Number now owned by this household for…**								
501.1	Trend in numbers for this animal type over past 3years								
501.2	Trend in health for this animal type over past 3years								
501.3	Trend in feed supply for this animal type over the past 3years								

Trend codes for

501.1 Trend in numbers for this animal type over past 3years

Decreased 1
Generally stays the same 2
Has markedly increased 3

501.2 Trend in health for this animal type over past 3years

Decreased 1
Generally stays the same 2
Has markedly increased 3

501.3 Trend in feed supply for this animal type over the past 3years

Decreased 1
Generally stays the same 2
Has markedly increased 3

Q.No.	Question and Filters	Coding Categories	Skip to
502	If the household has goats? **(Please do not ask verify with livestock information table and circle appropriate code)**	Yes ..... 1 No ..... 2 →	 503
502.1	If yes, what are they used for ***(Rank list from most to less important)*** 1. _____ 2. _____ 3. _____		

	4. _____ 5. _____		
503	Over the past 3 years, on average, how many goats has this household sold	a. Per year_____ b. Per month_____	
504	Does the HH have interest in selling more goats	Yes ..... 1 No ..... 2 → 504.2 Don't know ..... 98 → 506	
504.1	If **interested** in selling more goats, please explain the reasons _____ _____ _____ _____ _____		Go to 505
504.2	If **not interested** in selling more goats, please explain the reasons _____ _____ _____ _____ _____		Go to 506
505	If the HH has interest in selling goats, give up to 3 constraints that *most limit* goat production or sale ***(Be specific and rank list from most important to less important)*** 1. _____ 2. _____ 3. _____		
506	Give the most important livestock production problems, overall, for this HH ***(Be specific and rank list from most to less important; also consider effects of a warmer, drier climate)*** 1. _____ 2. _____ 3. _____ 4. _____ 5. _____		

SECTION 6: Crop Production

Provide crop information below averaged over the past 3years:

Species (Variety)	Rice		Corn		Millet		Barley		Wheat		Potato		Fallow*		Other*		Sum
	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	
601. Percent area planted for this crop in the irrigated valley bottoms																	**100**

602. Percent area planted for this crop in the non-irrigated terraces																	100
603. Percent post-harvest loss for this crop																	--

T/N = Traditional/New Traditional=1 New=2

(For new crops only, please fill up the table below)

Species (Variety)	Rice	Corn	Millet	Barley	Wheat	Potato	Fallow*	Other*
604. What the new sources of seeds, cuttings, etc								
605. Are the new materials drought-tolerant?								
606. Are the new materials suitable as cash crops?								

Provide tree-crop information (if any) below averaged over the past 3years

Species (Variety)															Sum
	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	%	T/N	
607. Percent area planted for this tree crop in various sites															100
608. Percent post-harvest loss for this tree crop															100

(For new tree-crops only, please fill up the table below)

Species (Variety)								
609. What the new sources of seeds, cuttings, etc								
610. Are the new materials drought-tolerant?								
611. Are the new materials suitable as cash crops?								

Describe traditional and new (if any) soil management methods over the past 3 years:

Location	Practice	Traditional Methods	New Methods (if any)	
			Description	Help conserve soil moisture or soil fertility? Yes =1 No=2
612. Valley bottoms	a. irrigation			
	b. tillage/seeding			
	c. weeding			
	d. fertilization			
	e. mulching			
	f. fallowing			
	g. harvesting			
	h. pest control			
613. Terraces	a. irrigation			
	b. tillage/seeding			
	c. weeding			
	d. fertilization			

	e. mulching			
	f. fallowing			
	g. harvesting			
	h. pest control			
614. Tree-crop sites	a. irrigation			
	b. Tillage			
	c. weeding			
	d. fertilization			
	e. mulching			
	f. fallowing			
	g. harvesting			
	h. pest control			

615. New methods that Help conserve soil moisture or soil fertility from above table	615.1. Explanation how it was helpful

Consider all practices shown in Q612, 613 and 614 together; estimate an average and
Provide soil management information over the past 3 years:

Species (Variety)	a. Irrigated Valley Bottoms	b. Non-irrigated Terraces	c. Other Tree-crop sites	
616. Percent soil surface area managed using traditional methods				

[Note: Consider all practices shown in Q612, 613 and 614 together; estimate an average. Expand columns as needed.]

Please provide information below

Q.No.	Question and Filters	Coding Categories	Skip to
617	What are the most important crop-related problems, overall, for this HH? ***(Be specific and rank list from most important to less important; include terraces, valley bottoms, and sites where tree crops occur; consider all aspects of production and post-harvest, as well as effects from a warmer, drier climate)***	1. _____ 2. _____ 3. _____ 4. _____ 5. _____	

SECTION 7: Food and Health for People

701	What are the 3 most important food- or health-related problems for this household? ***(Be specific and rank list from most important to less important, and consider all aspects of food quantity or quality that is produced in the home or purchased off-farm)***	1. _____ 2. _____	

		3. _____	
702	If the climate becomes permanently warmer and drier, what does the HH need most to support its basic food and health requirements? ***(Be specific and rank list from most important to less important; consider all aspects of food quantity or quality produced in the home or purchased off-farm)***	1. _____ 2. _____ 3. _____ 4. _____ 5. _____	

SECTION 8: MIGRANTS

This Section is only for Migrants. Please go back to the Section 1, Household Composition and copy exactly the same line no and Name of the household members, who are currently absent (if Q106=2) in the household, in the following table. *(Please verify line no of each person in HH Roster)*

Q801. How many of total family members are currently absent in the Household ☐☐

802. Line No of the HH member *(from HH compositio n)*	**Q803. Name of the HH member who are currently absent from the HHs** *(if Q106=2)*	**Q804. Destination(s)** Where has the HH member gone (currently)? **See codes below**	**Q805. Work Obtained** What does the HH member do at the place s/he has gone?	**Q806. Length of Time Away** For How long the Household member is away from Home continuously? (Code '00' for less than a month)
			_____ _____	☐☐ ☐☐ Month(s) Year(s)
			_____ _____	☐☐ ☐☐ Month(s) Year(s)
			_____ _____	☐☐ ☐☐ Month(s) Year(s)
			_____ _____	☐☐ ☐☐ Month(s) Year(s)
			_____ _____	☐☐ ☐☐ Month(s) Year(s)

Codes:

Q804. Destination

Other place within the district 1
Other district within the country 2
India 3

(If Reported India)

Specify City/place of India _____

Other country other than India (Specify)___
Don't Know 98

THE END

Other Notes:

Question Number	Notes

Expand as needed

Annex-II

ENUMERATORS TRAINING SCHEDULE FOR BASELINE STUDY

December 2013

Training Objectives:

- To share the objectives of the baseline study;
- To train on the baseline study methodology;
- To train on data collection instruments of the baseline study; and
- Overall to ensure the quality of data collection and data management at field as per the study protocol.

Training Programme:

Time	Sessions	Materials
Day 1		
09:00 – 9:30	**Registration and Tea**	
09:30 – 10:00	• Welcome • Introduction of the participants, • Introductory remarks	
10:00-10:15	• Training norms • Sharing of the training program	
10:15 – 11:00	Overview of study protocol	
11:00 - 11:15	**Tea Break**	
11:15 – 1:00	Overview of sampling and sampling techniques (Basic theory)	Marbles (200 pcs 2 colors)
01:00 – 02:00	**Lunch Break**	
02:00 – 03:00	Sampling game	Marbles (200 pcs 2 colors)
03:00 – 03:15	**Tea Break**	
03:15 – 05:00	• Overview of study methodology (Sampling) • HH selection game	Envelop (50 pcs)
Day 2		
9:00 – 9:15	**Tea**	
09:15 - 09:30	Reflection of Day 1	
09:30 – 10:30	Overview of baseline questionnaire	
10:30 – 11:00	In-depth review of Consent form	
11:00 – 11:15	**Tea Break**	
11:15 – 12:00	In-depth review of Section 1 of the questionnaire	
12:00 – 1:00	In-depth review of Section 2 and 3 of the questionnaire	
01:00 – 02:00	**Lunch Break**	
02:00 – 03:00	In-depth review of Section 4 and Section 5 of the questionnaire	
03:00 – 03:15	**Tea Break**	
03:15 – 04:15	In-depth review of Section 5 and Section 6 of the	

Time	Sessions	Materials
	questionnaire	
04:15 – 05:00	In-depth review of Section 7 of the questionnaire	
Day 3		
09:00 – 9:15	**Tea**	
09:15 - 09:30	Reflection of Day 2	
09:30 - 10:30	Interview techniques	
10:30 – 1:00	Mock interview practice of consent form (With 15 min tea break)	
01:00 – 02:00	**Lunch Break**	
02:00 - 05:00	Mock interview practice of questionnaire (With 15 min tea break)	
Day 4		
09:00 - 09:15	**Tea**	
09:15 - 10:15	Field practice planning	
10:15 - 01:00	Field practice of the questionnaire in Martadi (Interview practice by all enumerators)	
01:00 – 02:00	**Lunch Break**	
02:00 - 03:30	Reporting back by each enumerators	
03:30 – 03:45	**Tea Break**	
03:45 – 05:00	Solutions to issues/problems identified in the field practice	
Day 5		
09:00 - 09:15	**Tea Break**	
09:15 - 11:00	Roles and Responsibilities of enumerators and supervisors	
11:00 - 11:30	**Tea Break**	
11:30 - 01:00	Field plan of enumerators and supervisors (Who is going where?)	
01:00 – 02:00	**Lunch Break**	
02:00 - 03:00	Contract/Per diem and financial requirements	
03:00 – 03:15	**Tea Break**	
03:15 – 05:00	Logistics preparation • Questionnaire distribution • Per diem • HH list • Information for where to stay • Foods/Luggage/Medicines • Others	
04:15 – 05:00	**Closing remarks:**	